

WE CLAIM:

1 1. A system for managing a network comprising:
2 a first network element;
3 a second network element connected to said first network element;
4 a network management system connected to said first and second network
5 elements; and

6 wherein said first and second network elements each include means for
7 encoding a unique identifier associated with each of said network elements, a
8 processor coupled to said encoding means, and means for physical layer auto-
9 discovery.

1 2. The system in accordance with claim 1 wherein said means for physical
2 layer auto-discovery comprises:

3 a program storage device readable by a processor and tangibly embodying a
4 program of instructions executable by the processor to perform a method of
5 communicating connectivity information between said first and second network
6 elements, the method comprising the steps:

7 sending a request packet at the physical layer from the first network element
8 to the second network element;

9 receiving a respond packet at the physical layer in response to said sent
10 request packet.

1 3. The system in accordance with claim 2 wherein said request packet
2 comprises a first packet protocol identifier, a sequence number, and a first padding.

1 4. The system in accordance with claim 2 wherein said response packet
2 comprises a second packet protocol identifier, said sequence number, a far end
3 electronic serial number, a far end port identifier, and a second padding.

1 5. The system of claim 1 wherein said first network element is connected to
2 said second network element by an optical fiber link.

1 6. A method for automatically discovering a network topology comprising the
2 steps of:

3 assigning an electronic serial number and unique port identifier to a network
4 element;

5 representing the network element in a network management system based on
6 said assigned electronic number;

7 communicating connectivity information between the network element and a
8 neighboring network element based on said assigned electronic serial number and
9 unique port identifier; and

10 communicating said connectivity information to the network management
11 system so that the connectivity information is associated with said representation of
12 the network element.

1 7. The method in accordance with claim 6 wherein said step of assigning an
2 electronic serial number comprises the steps of assigning a network element model
3 number and a network element serial number.

1 8. The method in accordance with claim 6 wherein said step of representing
2 the network element in a network management system comprises the step of
3 assigning a CORBA object to the network element and associating the CORBA
4 object with said assigned electronic serial number.

1 9. A network element comprising means for encoding an electronic serial
2 number associated with each the network element, a processor coupled to said
3 encoding means, and means for physical layer auto-discovery coupled to said
4 processor and wherein said processor uses the encoded electronic serial number

5 and the autodiscovery means to discover all other network elements linked to the
6 network element.

1 10.A request packet for use in a physical layer auto-discovery protocol
2 comprising a packet protocol identifier, a sequence number, and padding.

1 11.A response packet for use in a physical layer auto-discovery protocol
2 comprising a packet protocol identifier, a sequence number, a far end electronic
3 serial number, a far end port identifier, and padding.